9

FLUORINE PUMP SITE

Liquid fluorine pumps with speeds up to 20,000 revolutions per minute, and flow rates of 50 pounds per second, can be tested at this laboratory.

Because fluorine is the most active oxidizer known, it has great potential in the chemical rocketry field.

3. *NASA LEWIS RESEARCH CENTER*

Liquid fluorine pump tests were conducted at the "I" Site of the NASA Lewis Research Center Plumbrook Station. The pressure and flow capabilities of the system were suitable for testing of modified RL10 oxidizer pumps, which made it possible to accomplish the pump testing required for the program without constructing new facilities.

The propellant system of the facility is shown schematically in figure B-8. It consists of a closed liquid fluorine loop incorporating the pump, a liquid nitrogen heat exchanger, a liquid fluorine accumulator, and necessary shutoff and control valves. Liquid nitrogen troughs are provided to cool all horizontal runs of fluorine piping.

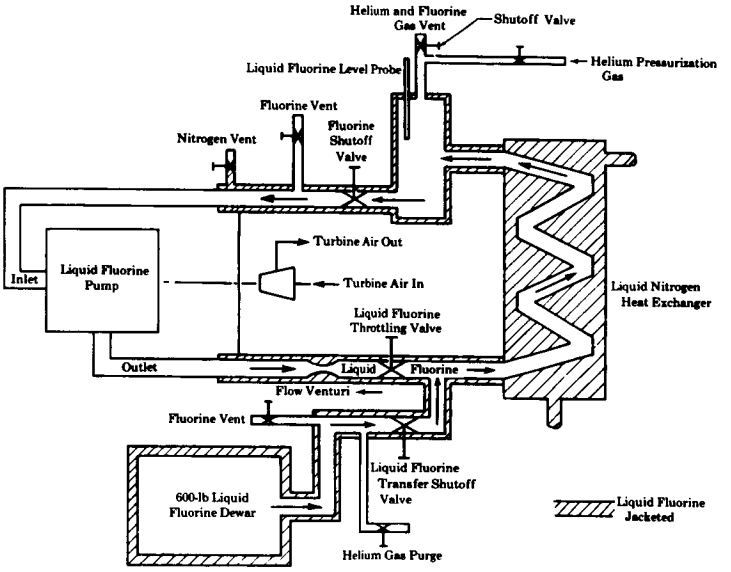


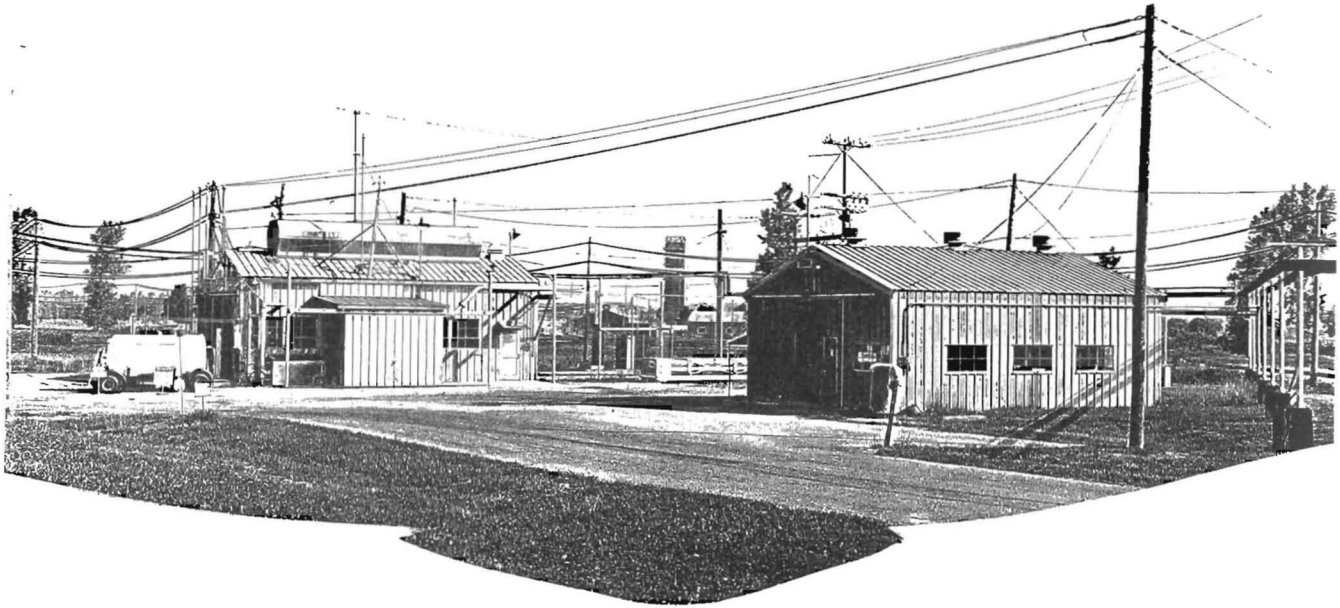
Figure B-8. Liquid Fluorine Pump Loop Facility *FD 13724*

The closed fluorine loop has the advantage of permitting pump tests to be accomplished with commitment of a minimum amount of liquid fluorine. The total capacity of the system is approximately 500 pounds.

Automatic closed loop controls available at the facility permitted complete programing of pertinent pump parameters to obtain standard pump performance data. Typical operation of the RL10 oxidizer pump included a controlled speed ramp to operating conditions, and automatically controlled flow excursions at constant controlled inlet total pressures. Tests were limited to static pump inlet pressures at or above ambient pressure to preclude the possibility of leakage into the system.

Data acquisition systems available to "I" Site include a low-level input analog-to-digital converter system with magnetic tape recording as well as

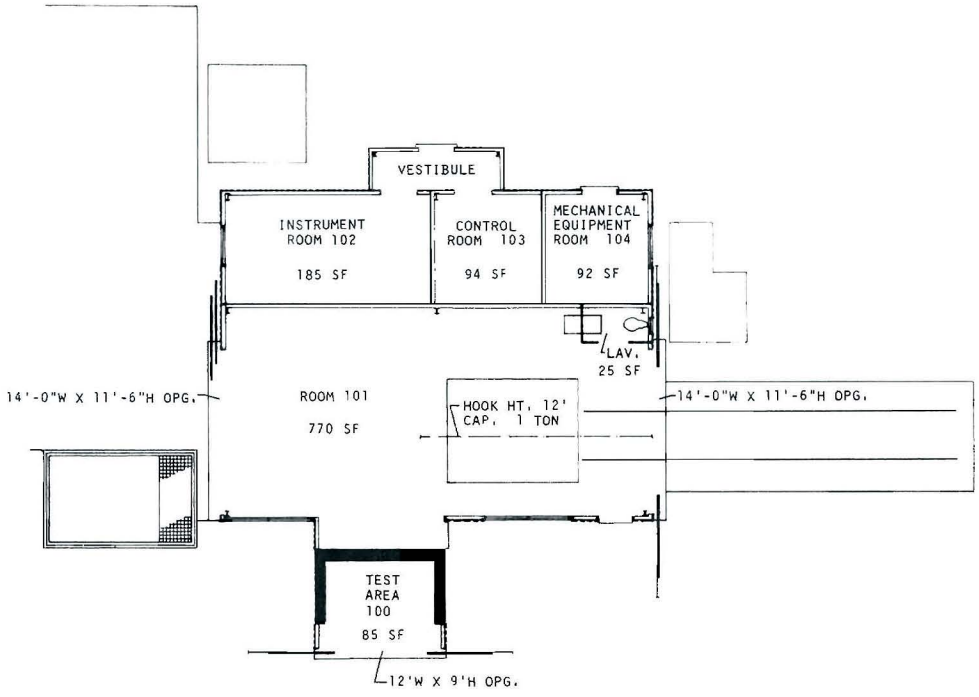
several types of direct inking recorders and oscillographs necessary for test monitoring purposes. In testing of the RL10 oxidizer pump, all pertinent parameters were monitored on low-speed recorders during the entire period that fluorine was in the pump. The analog-to-digital data system was used only periodically to obtain performance data at selected points.



9 FLUORINE PUMP SITE

Fluorine is the most active oxidizer known. For this reason, its use in the chemical rocketry field is being explored.

At this site, liquid fluorine pumps with speeds up to 20,000 revolutions per minute and flow rates of 50 pounds per second can be tested.



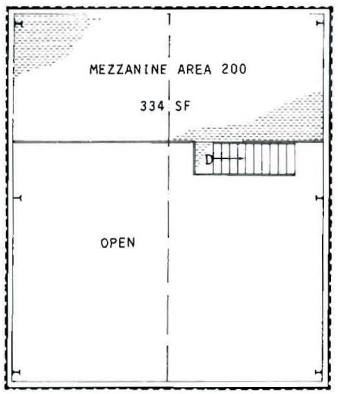
REF. DRWG. PF-20862

I SITE TEST BUILDING

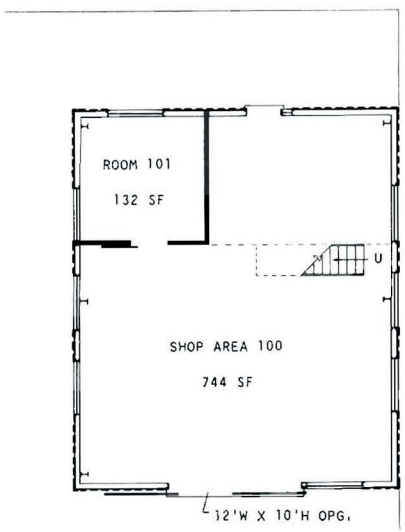
BUILDING NO.
2611

8 0 8 16
SCALE 1/16" = 1'-0"

NASA LEWIS RESEARCH CENTER - PLUM BROOK STATION
SANDUSKY, OHIO

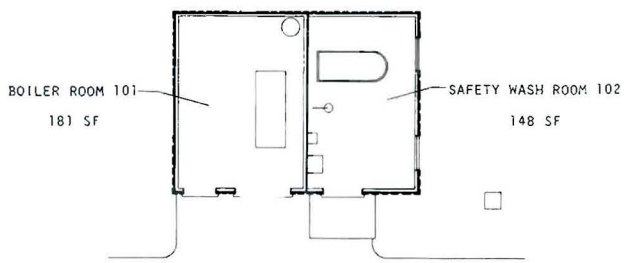


MEZZANINE



FIRST FLOOR

2621
I SITE SHOP BUILDING
REF. DRWG. PF-SK-670908Y



2631
I SITE BOILER AND SAFETY WASH BUILDING
REF. DRWG. PD-22707

N

8 0 8 16
SCALE 1/16" = 1'-0"

I SITE SHOP BUILDING AND BOILER AND SAFETY WASH BUILDING

BUILDING NO. 2621 & STRUCTURE NO. 2631